evidently remarkably successful. Prof. Thorpe, who was in charge of this expedition, sent to Lord Kelvin the following telegram:—"April 19, 1893. Thorpe to President Royal Society, Burlington House, London. Eclipse successfully observed at Fundium. Position good, weather fine, very slight haze. Slit spectroscope good, but mainly prominence lines; calcium and hydrogen seen projected on moon. Thirty prismatic camera photographs, eighteen excellent; mainly prominence lines; corona lines doubtful. Ten coronograph pictures, six very good. Photometric work successful; twenty comparisons with equatorial, eleven with integrating apparatus. Deslandres and Colculesco also observed at Fundium, with good results. No word from Bigourdan at Joal. Health of expedition good. Blonde leaves for Teneriffe to-morrow.—Thorpe."

With regard to the work of the same expedition, a correspondent of the *Times* telegraphed from Bathurst on April 19:—"The solar eclipse was successfully observed at Fundium, Senegal. The weather was fine, with only a very slight haze. The results of the slit spectroscope were good. Thirty prismatic camera photographs were taken, eighteen of which are excellent, while of ten coronograph pictures six are very good. The photometric work was successful, and twenty comparisons were taken with the equatorial and eleven with the integrating apparatus. The French astronomers, MM. Deslandres and Colculesco also made observations at Fundium with good results. The health of the expedition is excellent."

Last week we gave the substance of a telegram regarding Prof. Pickering's observations at Minasaris. The *New York Herald* has published a telegram from Valparaiso, containing the following supplementary information as to Prof. Pickering's work:—"The sunlight changed during the period of totality and presented a pale yellow hue. A faint chill was perceptible in the air. The photographic results with the differential spectroscope give twenty lines in the solar atmosphere at a time of 34 seconds previous to totality. Two rays of light were seen issuing from the cusps, their terminal points corresponding to the horns of the new moon. The cusps were in violent motion. The corona showed a conical structure with a network of fine filaments visible to the naked eye. Four light streamers from the corona were noticeable, and seven prominences were observed, which latter were estimated to attain a height of 80,000 miles. The integrating spectroscope showed one red, one yellow, and one blue line and two green lines in the corona. The prominences were well photographed."

The following is a Reuter's telegram from San Francisco, relating to the work of the American expedition to Chili:—"Prof. Holden, the director of the Lick Observatory, has received a telegram from Prof. Schaebele, the leader of the American expedition to Chili, stating that his observation of the sun's total eclipse was successful. The drawings of the corona made a year ago by Prof. Schaebele were found to be a true representation of the corona actually visible in the present eclipse. Fifty photographs were secured by means of the three telescopes used by the observers. One of these gave an image of the sun 4 in. in diameter, and the corona covered a plate 18 by 22 in."

NOTES.

All the most essential arrangements have now been made for the Nottingham meeting of the British Association. The first general meeting will be held on Wednesday, September 13, at 8 p.m., when Sir Archibald Geikie will resign the chair, and Dr. J. S. Burdon Sanderson will assume the presidency and deliver an address. On Thursday evening, September 14, there will be a soirée; on Friday evening a discourse will be delivered by Prof. Arthur Smithells on "flame"; on Monday evening Prof. Victor Horsley will deliver a discourse "on the discovery of the physiology of the nervous system"; on Tuesday evening there will be another soirée; and on Wednesday afternoon, September 20, the concluding general meeting will be held. Excursions to places of interest in the neighbourhood of Nottingham will be made on the afternoon of Saturday, September 16, and on Thursday, September 21. The following will be the presidents of sections:—A (Mathematical and Physical Science), Prof. R. B. Clifton, F.R.S.; B (Chemistry and Mineralogy), Prof. J. E. Reynolds, F.R.S.; C (Geology), Mr. J. J. H. Teall, F.R.S.; D (Biology), Rev. H. B. Tristram, F.R.S.; E (Geography), Mr. H. Seebohm; F (Economic Science and Statistics), Prof. J. S. Nicholson; G (Mechanical Science), Mr. Jeremiah Head; H (Anthropology), Dr. Robert Munro.

The Chemical Society will hold on Friday, May 5, a Hofmann Memorial Meeting. Addresses will be delivered by Lord Playfair, Sir F. A. Abel, and Dr. W. H. Perkin.

The annual dinner of the Royal Geographical Society will take place on Saturday, May 13, at the Whitehall Rooms, Hôtel Métropole, Sir Mountstuart E. Grant Duff in the chair.

At the recent Graduation Ceremony of the University of St. Andrews the honorary degree of LL.D. was conferred on Prof. Henry E. Armstrong, Ph.D., F.R.S., in recognition of his eminent services to organic chemistry.

On Thursday, May 4, the forty-first anniversary of the election of the Secretary of the Institution of Civil Engineers as an Associate, the first "James Forrest" lecture will be delivered by Dr. W. Anderson, F.R.S., the subject being "The Interdependence of Abstract Science and Engineering."

The City and Guilds of London Institute has forwarded to county councils throughout the kingdom, and to the secretaries of technical schools in connection with the Institute, a circular letter indicating various ways in which it has improved and enlarged the scope of its technological examinations. Among the alterations may be mentioned the addition of practical tests in photography, boot and shoe manufacture, goldsmiths' work, mechanical engineering, and other subjects; the subdivision of many subjects into sections to suit the requirements of different branches of the same trade; and the addition of examinations in such subjects as manual training and dressmaking. After careful consideration of the difficult questions involved in the organisation, for the first time, of a system of inspection of technical classes, the Committee of the Institute have adopted a scheme, and are prepared to receive applications from county councils or school committees for the inspection of classes in technical (other than agricultural) subjects, and also for special reports on the results of the examination of the students of separate classes registered under the Institute.

It has been resolved by the Council of the Zoological Society of London to award the Society's Silver Medal to Donald Cameron, of Lochiel, and John Peter Grant, of Rothiemurchus, in recognition of the efforts they have made to protect the Osprey (*Pandion haliäetus*) in Scotland. The osprey, formerly common in many parts of the British Islands, has become so rare of late years that it is stated that only three pairs of this bird have been known to breed in this country for some years past.

The hon. secretaries of the Australasian Association for the Advancement of Science are sending out invitations to the leading scientific societies in Europe drawing attention to the meeting of the Association, which will be held in Adelaide, commencing on September 25 next. Sydney, Melbourne, Christchurch, and Hobart are the places in which the previous meetings of the Association have been held. The meeting in

Adelaide will be presided over by Prof. Ralph Tate, of the University in that city.

THE late Admiral Marquis Ricci of Genoa, formerly Minister of Marine of the Kingdom of Italy, has left a large sum, estimated to amount to about three million lire (£120,000) to the authorities of his native city, for the purpose of founding a Scientific Institution. It is believed that this is likely to be devoted to a new site and building for the Museo Civico of Genoa, an Institution which, under the directorship of the Marquis G. Doria, has, as is well known to all naturalists, carried on splendid work in zoology for many years. We are sure that no better object could be selected for the appropriation of this munificent donation.

MR. G. W. LICHTENTHALER, who died lately at San Francisco, bequeathed to the Illinois Wesleyan University at Bloomington—where he had lived during most of his life—his very valuable natural history collection. It includes from 6000 to 8000 species of shells, 1000 species of marine algæ, and 500 species of ferns, besides thousands of duplicates. Mr. Lichtenthaler also bequeathed 500 dollars to put the collection in suitable shape for preservation.

IN connexion with the International Congress of Medicine and Hygiene, to be held in Rome next September, there will be an exhibition opened (from September 15 to October 15) for apparatus, plans, materials, models, &c., relating to the following: Research in biology, therapeutics and hygiene, medical practice, improvement of the soil, sanitation and hygienic service of towns, hygiene of the interior of public and private buildings, individual hygiene, the health of workpeople, hydrology and balneo-therapeutics, &c. Diplomas and medals will be awarded. For information on the subject application is to be made to the President, Prof. L. Pagliani, Minister of the Interior, Rome.

A NEW scientific society has been organised in Washington, called "The Geological Society of Washington." There are already more than a hundred members. The object of the society is the presentation of short notes on work in progress rather than the reading of elaborate papers. At the first meeting Major J. W. Powell, director of the U.S. Geological Survey, presided, and papers were read by Mr. H. W. Turner, on the structure of the gold belt of the Sierra Nevada, and by Mr. S. F. Emmons on the geological distribution of ore deposits in the United States.

THE disturbed weather conditions referred to in our last issue resulted in a few thunder showers only, more particularly in the southern districts, accompanied by slight rain at some stations. With these exceptions and some local fogs, brilliant weather has been experienced throughout the whole of the United Kingdom. The temperature in the southern and midland districts has been much above the average; a considerable increase set in on the 17th inst., the maximum in London reaching 70°, and since that time some remarkably high readings have been recorded. On the 20th the thermometer over the inland counties ranged from 80° to 84°, while at Yarmouth it read 30° lower, and for several days the difference between these neighbouring districts has been very considerable. In the night of the 22nd a sharp thunderstorm occurred over South Devonshire, accompanied by a local rainfall amounting to nearly three-quarters of an inch, and another storm, with slight rain, occurred at Holyhead in the night of Monday, 24th; but in the early part of the present week the conditions were anti-cyclonic over a great part of the country, and the weather was very dry. The *Weekly Weather Report* of the 22nd instant states that rainfall was upon the whole less than the mean in all the wheat-producing districts and in the south-west of England, while in Ireland and the west of Scotland there was a slight excess. Bright sunshine was less prevalent than for some weeks past; the percentage of possible duration ranged from 24 in the east of Scotland to 58 in the south of England.

THE meteorological authorities in the United States are doing their utmost to utilise weather forecasts by adopting various means for their wide and rapid dissemination. The *American Meteorological Journal* for April contains accounts of two methods recently inaugurated in New England. From September 12 to October 1, 1892, an electric search light placed on Mount Washington was used for flashing forecast signals over the surrounding country. Reports received from persons in the vicinity show that the plan was quite successful, and the flashes were reported to have been seen at a distance of eighty miles. It is intended to resume this novel method next summer. The local forecast official at Boston sends out three hundred printed copies of forecasts daily by rail. The bulletins are distributed from the trains, and posted immediately on receipt in the various railway stations in neat frames provided for the purpose by the Weather Bureau. In this way the forecasts are brought before the public in as short a time as possible.

PROF. J. MARK BALDWIN, of the University of Toronto, has accepted the Stuart Professorship of Psychology in the Princeton University, and will begin work there in September. *Science* says that a suite of rooms has been set apart in North College for experimental psychology, and that a liberal appropriation has been made for its equipment.

MR. W. DE MORGAN, in accordance with the request of the Egyptian Ministry of Public Instruction, has been making experiments at Cairo with Egyptian clays with a view to determine whether it would be possible to use them for the production of glazed earthenware. A correspondent of the *Times* at Cairo says that after about eight weeks' work Mr. de Morgan considers that, whilst the production of porcelain and white earthenware is quite out of the question, there exist abundant materials for other descriptions of pottery, especially white majolica, similar to delft or della Robbia ware. But the cost of fuel is a stumbling-block. Mr. de Morgan, says the correspondent, considers that nothing can exceed the skill of the native throwers, who, with the most simple contrivances, produce far better results than the European workmen with elaborate apparatus.

IN his report for 1892 Dr. Trimen, the director of the Royal Botanic Gardens, Ceylon refers to the fact that of every 100 lbs. of tea consumed in England during the year 84 lbs. were of British growth, viz. 53 in India and 31 in Ceylon, only 16 lbs. being the produce of China. There was an increase of nearly 2,000,000 lbs. in the direct export of Ceylon tea to Australia, viz. 5,166,154 lbs. against 3,210,598 lbs. in 1891; and Dr. Trimen thinks that the costly advertisement at the forthcoming Exhibition in Chicago may reasonably be expected to lead to a large sale in the future in America. Ceylon, he says, urgently needs this; for while there is no reason to fear any drawback to continued success as far as cultivation and manufacture are concerned, there is a real danger of over-production; and its consideration as a possibility, by no means remote, induces him earnestly to recommend those concerned to devote some portions of their land to other cultivations. In the low-country especially much caution should be exercised in opening further land in tea estates. One result of the enormous development of the tea industry in the island is unfortunate. The industry so overshadows all other cultivations that there is now little room for trial or experiment with smaller products on estates, and not much stimulus to investigate them in the Botanic Gardens.

A COMMITTEE called the School Gradation Committee is at present being formed, the object of which, according to the

Times, is to promote the systematic and consecutive gradation of schools and universities, and to supplement the valuable work of recent years in respect of technical instruction by an effort to bring all effective schools and colleges, whether specialised or not, within a comprehensive national scheme. It is thought that this "may be most economically done, with the *minimum* of interference, centralisation, and narrowing uniformity, by the recognition and encouragement of existing effective schools, and by using available resources under local control mainly to facilitate the ascent of pupils from lower to higher grades." Among the members of the committee are Sir H. Roscoe, Sir P. Magnus, Prof. R. C. Jebb, Prof. Max Müller, and Prof. H. Sidgwick.

TO determine the light refraction of liquid oxygen, Herren Olszewski, and Witkowski (Cracow Academy) have lately made use of total reflection. The liquid was held in a metallic case having windows, and a number of protective envelopes. Into it dipped a double plate formed of two plane-glass plates, with an air layer of 0·006 mm. between, which could be turned from without through a given angle. Monochromatic light was introduced, and the refraction of the liquid determined by means of the bright interference-fringes observed with the netting of the telescope at the borders of the field of total reflection. The relative index of refraction was found to be 1·2232, and the absolute coefficient 1·2235 (Dewar and Liveing, with the prism method, obtained 1·2236). The same authors sought also to determine light-absorption, using for the liquid a protected tube closed below with a glass plate, while another tube with terminal glass plates, dipped in the liquid above, and could be screwed up or down. A ray of light was sent through from below, and passing through various thicknesses of liquid (according to the position of the inner tube) was reflected in a spectral photometer, and compared with a direct ray. For the spectral region of most intense absorption of the green yellow (between $\lambda = 577$ and $\lambda = 570$), values between 84 and 89 per cent. were obtained for the light passing through 1 mm. thickness of oxygen; for the red absorption band 88.

THE question of the purity of ice consumed for alimentary purposes in Paris has been lately before the Conseil de Salubrité de la Seine (*Rev. Sci.*). This ice is of two sorts, manufactured and collected. The production of artificial ice is about 27,000 tons a year, and of the "crop" of natural ice, the lac Daumesnil at Vincennes yields about one-half (12,000 to 15,000 tons a year). The price of the manufactured ice is eighteen to twenty francs a ton; that of the collected ice three to four francs. The demand in Paris is not wholly met from those two sources; and there is some ice imported from Sweden and Norway, which is, naturally, dearer than the ice from lakes, &c., in France. Now the lake Daumesnil just referred to is polluted on the one hand by the entrance of a sewer, and on the other by an artificial stream from the plateau of Gravelle; this stream traverses the Bois de Vincennes, and in the fine season receives all sorts of impurities from its banks. It is a question, therefore, of interdicting the collection of ice from this lake. The sewer it appears, might be suppressed, but the Administration cannot touch the stream. It is proposed to limit the use of ice from sources like this lake to applications in which the ice is not brought into direct contact with the liquids or solids to be cooled, and that when such contact takes place (as in cooling drinks) artificial ice alone should be used, got exclusively from spring water, or river water sterilised by heat.

THE Agricultural Department of New South Wales has been making a series of interesting and useful inquiries as to the plants most visited by bees in the various districts of the colony. Some of the results are set forth in the February number of the Department's *Gazette*. It has been clearly proved that the flora of Australia includes honey-producing trees, shrubs, and plants of a high standard of excellence; the honey produced by bees in the near neighbourhood of the forest being of the finest quality, and having few (if any) faults. While a gum-tree is in bloom the bee will pass over the most tempting plant in a garden and wing its way to the borders of the bush; but, on the other hand, a field of maize in tassel is a source of the greatest pleasure to the busy little workers, who swarm in countless numbers, collecting the pollen so necessary for their wants. The plants which next seem to have the greatest attraction are the fruit-trees, familiarly called summer fruits. Clover (both white and red) yields a large quantity of first-rate honey, and bees kept at places where clover grows never fail to visit the modest flowers of the plant; dandelion, also, is a valuable honey-yielding flower, and is noted in all districts from Albury to Tenterfield. As to the size and colour of the flowers most affected by the bees, much diversity of opinion exists among apiarists, and in the face of the very conflicting replies, the *Gazette* thinks it would be vain to try to determine what coloured flowers are most attractive.

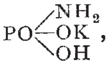
IT is not, perhaps, generally known that the largest wine-growing district in Germany is Alsace-Lorraine. According to a report forwarded to his Government by the French consular agent at Frankfort, while the Wiesbaden regency has only 7,300 acres planted with vines which in 1890 yielded 1,644,040 gallons, the Coblenz regency 18,950 acres, giving 3,755,220 gallons, that of Trèves 8,980 acres, giving 1,832,400 gallons, Alsace-Lorraine alone contains 75,640 acres, the production of which in 1890 was 16,999,000 gallons (6,429,740 gallons in 1891), a production which is chiefly consumed in the country itself. According to the same authority (whose report is summarised in the current number of the Board of Trade Journal) the average annual production of wine in the whole world during the five years from 1886 to 1890 is estimated at 2,811,600,000 gallons. In this production Italy figures for 690,008,000 gallons, Spain for 657,250,000 gallons, and France for 606,562,000 gallons; that is to say these three countries supply two-thirds of the total quantity produced. Germany, with an average annual production of 51,705,610 gallons, only occupies the tenth place among wine-growing countries. The value of some of her wines partly compensates her, however, for the relatively small quantity of her annual crop.

THE Imperial Forest School at Dehra Dun seems to be exercising a remarkably wholesome influence on the native students who attend its classes. Addressing the students at the recent annual distribution of certificates and prizes, Sir E. C. Buck, secretary to the Government of India in the Revenue and Agricultural Department, said that the school had been a signal success in the widest sense. The student who passed through a technical school was usually fitted only for the technical profession which he was taught at the technical school. But the Dehra School teaching was of such a broad and useful character that he believed its students, that is, the students who passed out of it successfully, would be more fit for any kind of work requiring originality and practical treatment than the students of any school or college in India. It was the only important educational institution in India in which the student was taught more in the field and in the museum than in the lecture room; in fact in which he was taught how to observe, and how to draw conclusions from observation. The consequence had been that the only signal instances which had, to his knowledge, occurred of original research leading to position and useful results being accomplished by natives of India, had been those in which such results had been produced by ex-students of the Dehra School. Only recently the Government of India had been obliged to close apprenticeships attached to the Geological Department, because natives of India could not be found qualified for original research. It was not that natives of India had not in them the necessary qualifications; it was that the power lay undeveloped in them, and had not been brought out by a training in habits of observation.

MESSRS. SWAN SONNENSCHEIN and Co. have in the press and will shortly publish a work by Dr. Edward Berdoe, entitled "The Healing Art," a popular history of the origin and growth of medicine in all ages and countries.

AT a recent meeting of the Société Française de Physique M. Janet gave an account of his experiments on electric oscillations of medium frequency (about 10,000 per sec.). The arrangement he employs is as follows:—A battery of accumulators furnishes a current which passes through a high resistance CD and a low resistance AB placed in series. The ends of AB are joined to the plates of a condenser and also to the extremities of a circuit AHB. The latter consists of a coil of self-induction L and resistance $\frac{R}{2}$ joined in series with an equal non-inductive resistance. The quantities RL and the capacity of the condenser are so chosen that when the circuit is broken at AB oscillations are set up in the condenser circuit. By means of an interruptor, closely resembling that used by Mouton in his work on the discharge of a condenser, the differences of potential e_1 and e_2 at the extremities of the inductive and non-inductive resistances are determined at different times after the breaking of the primary circuit, and the values plotted on a curve as functions of the interval after the break. If i is the current in the circuit AHB at any instant then the first curve gives the value of $\frac{R}{2}i + L\frac{di}{dt}$, and the second that of $\frac{R}{2}i$; so that $L\frac{di}{dt}$ is equal to the difference of the ordinates. The value of $\frac{R}{2}\frac{di}{dt}$ can be obtained from the second curve, so that if the self-induction is constant during an oscillation the ratio of these two quantities will be constant. This is found to be so, the value of L deduced from the curves being constant and also independent of the capacity of the condenser and of the electromotive force employed in the primary circuit. The author has also obtained from his observations the value at each instant of the difference of potential V between the plates of the condenser (a mica one) and of the charge Q, and he finds that the quotient $\frac{Q}{V}$, representing the capacity of the condenser, is greater for decreasing than for increasing values of V. The shape of the curves obtained recall those Ewing has found in the case of the magnetisation of iron, and indicate a kind of hysteresis or viscosity in the dielectric.

THE problem of obtaining a well-defined and trustworthy standard for the intensity of a source of light can hardly be said to be completely solved. Violle proposed as a unit the amount of light radiated by one square centimetre of molten platinum at the moment of solidification. But in order to keep the platinum absolutely pure, and its surface clean and smooth, it would be necessary to melt large quantities of the metal in an electric furnace. Siemens proposed platinum foil at the instant of melting, but a series of 500 meltings gave deviations of 10 per cent. in spite of the greatest precautions, mainly on account of the tearing of the foil on melting. According to a report recently presented to the Reichstag, the physicists of the Imperial Physico-Technical Institute at Berlin have been endeavouring to make Siemens' unit available for practical purposes by fixing the temperature of the platinum in some manner independent of its melting point. It was found that at any given temperature the ratio of the total radiation to that transmitted by a layer of water of a certain thickness was constant within 2 per cent. for plates of platinum of different thicknesses and from different sources. To measure the amounts of radiation a very delicate bolometer was constructed. A piece of platinum foil was welded on to a piece of silver foil of ten times its thickness, after which the combination was rolled between copper rollers down to a thickness of $\frac{1}{100}$ mm. It was then cut in a dividing machine so as to form a long continuous strip of 1 mm. breadth within a small area. Four such strips were mounted in a frame, and freed from silver by etching with acid, thus leaving strips $\frac{1}{1000}$ mm. thick. When tested, the bolometer was found to be extremely satisfactory. The Institute is at present engaged on determining the absorptive action of water and of the quartz vessel containing it. Further important questions are those regarding the effect of impurities in the platinum and the kind and duration of incandescence, questions which must be answered before the method can be regarded as thoroughly practical.

AMIDOPHOSPHORIC ACID, $PO.NH_2.(OH)_2$, the primary amine of orthophosphoric acid, has been isolated by Mr. H. N. Stokes, and its properties and those of several well-crystallising salts are described by him in the March number of the *American Chemical Journal.* It has hitherto been found impossible to obtain this substance owing to the extreme difficulty of regulating the decomposition by water or acids of the products obtained by the action of ammonia on pentachloride or oxychloride of phosphorus. It has now been obtained, however, by employing, instead of the two latter compounds, the ethers of phosphoric acid. The most advantageous method is to dissolve the chloride of diphenylphosphoric acid, $PO.Cl(OC_6H_5)_2$, in alcohol and to react upon it with alcoholic ammonia, when a beautifully crystalline substance, diphenylamidophosphate, $PO.NH_2.(OC_6H_5)_2$, is at once formed. This diphenyl ether of amidophosphoric acid yields an alkaline salt of amidophosphoric acid upon saponification with caustic potash or soda; upon converting this into the lead salt, decomposing the latter with sulphuretted hydrogen, and precipitating with alcohol, the free acid is obtained in the form of fine microscopic crystals. In the actual preparation it is not necessary to first isolate the chloride of diphenylphosphoric acid. It is only necessary to boil one molecular equivalent of phosphorus oxychloride with two molecular equivalents of phenol in a flask attached to a reflux condenser until no further evolution of hydrochloric acid occurs: the product contains, along with other derivatives, the chloro-diphenyl ether required. The liquid only requires to be diluted with alcohol, when the alcoholic ammonia may be directly added and the crystals of the amido diphenyl ether precipitated. Diphenylamidophosphate is a comparatively stable substance melting at 148° and resolidifying to a mass of crystals. The crystals are readily converted into acid potassium or sodium amido phosphate by means of a concentrated solution of caustic potash or soda; the reaction is very energetic and is complete in ten minutes. Upon acidification with ice-cold acetic acid and addition of alcohol, the acid salt is precipitated. Acid potassium amidophosphate,  $PO\begin{cases}NH_2\\OK\\OH\end{cases}$, crystallises in six-rayed stars or rhombohedra; the neutral salt is extremely soluble in water and is very difficult to obtain crystallised. The acid sodium salt usually forms small hexagonal crystals, and the neutral sodium salt also crystallises well and, unlike the potassium salt, is not deliquescent. The lead salt is obtained in the form of a precipitate, consisting of groups of radiating plates, upon adding a solution of lead acetate to a solution of the acid potassium salt. In order to obtain the free acid from it, the crystals are suspended in iced water and a current of sulphuretted hydrogen allowed to bubble through. The filtrate from the sulphide of lead may then be allowed to fall directly into alcohol when the crystals of amidophosphoric acid are at once deposited.

Amidophosphoric acid crystallises in tabular or short prismatic crystals which are insoluble in alcohol, but readily soluble in water, to which they impart a sweetish taste. The solution is readily distinguished from phosphoric acid inasmuch as it yields no precipitate with silver nitrate. It evolves no ammonia upon treatment with caustic alkalies, but merely forms the salt of the alkali metal. The solution slowly decomposes into ammonium phosphate. The solutions of the acid and neutral salts of the alkaline metals yield many corresponding acid and neutral amidophosphates of other metals by double decomposition with soluble salts of those metals.

Notes from the Marine Biological Station, Plymouth:—Last week's captures include *Phoronis hippocrepia*, the Actinian *Corynactis viridis*, and the Foraminiferan *Haliphysema*. In the floating fauna the Cœlenterate element remains unchanged; the larvæ of the Nemertine *Cephalothrix* have made their first appearance for the year; the number of Polychæte larvæ and of Cirrhipede *Nauplii* has become considerably smaller; the later stages of various Decapod Crustacea (*Megalopa*, *Mysis*-stages) have appreciably increased in numbers; and minute young *Oikopleuræ* now occur in considerable quantity. The "gelatinous alga" and *Rhizoselenia* are extremely abundant. The Hydroid *Tubularia bellis*, the Gastropod *Nassa reticulata*, and the Decapod Crustacea *Pagurus lævis*, *Galathea squamifera*, *Porcellana platycheles* and *Pilumnus hirtellus* are now breeding.

The additions to the Zoological Society's Gardens during the past week include an Orang-Outang (*Simia satyrus*, ♂) from Borneo, presented by Mr. Thomas Workman; a Spotted Ichneumon (*Herpestes nepalensis*) from India, presented by Lady Blake; a Raven (*Corvus corax*) British, presented by Lady Rose; a Peregrine Falcon (*Falco peregrinus*) British, presented by the Old Hawking Club; a Greek Tortoise (*Testudo græca*) European, presented by Mrs. Alcock; a Martineta Tinamou (*Calodromas elegans*) from Argentina, three Spotted-sided Finches (*Amadina lathami*) from Australia, purchased; a Panama Amazon (*Chrysotis panamensis*) from Panama, received in exchange; six Indian Wild Swine (*Sus cristatus*), four Barbary Mice (*Mus barbarus*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Large Telescopes.—Much has been written during the last few months with reference to the usefulness or non-usefulness of large telescopes. That the verdict is given in favour of the former is not at all surprising, for are we not far away from the limit, if there be one, beyond which larger instruments will be available? Dr. Common has many times pointed out the practicability of constructing large reflectors (his five-foot being a good example of the type of instrument he could enlarge), while the Lick instrument, the work of the Clarks, is really only a beginning of what will be done in large telescope building. For refractors it has many times been urged that the increase in size of lenses involves such a thickness that much light is thereby lost by absorption. M. Alvan G. Clark, with reference to this particular point, says a few words in *Astronomy and Astrophysics* for April, in which he points out that such is not the case. Greater aperture means greater light-grasping power, and as it is quite unnecessary to considerably increase the thickness of the lens, the former predominates over the latter. With the forty-inch discs, he says, only a combined thickness of four inches is required, and with lenses of an object-glass of even six feet aperture a combined thickness of only six inches would be necessary. It is pleasing to hear through him that a steady improvement is being made in manufacture of glass, and that the present discs are *infinitely* superior to the early ones, and "who knows," as Mr. Clark says, "how soon still more transparent glass may be at hand."

Spectrum of β Lyræ.—The extreme interest that lies in this variable, especially for spectroscopists, makes it a subject of keen research, and the important observations made by Prof. Keeler with the great Lick refractor, and contributed to the number of *Astronomy and Astrophysics* for April, will be the more eagerly read. The observations were undertaken with the intention of connecting possible changes in the spectrum of the star with its period of light variability. After plotting a number of observations on the light curve of the star, the recorded appearances of the spectrum "were in some degree contradictory," although certain results were obtained, but they were left incomplete, owing to Prof. Keeler's withdrawal from the observatory. The results may be briefly stated as follows:—

(1) Bright hydrogen lines C and F, bright D_3 line and dark D lines are always visible with the Lick refractor. Certain fainter bright lines are absent only at principal minimum.

(2) Light variations due to changes in brightness of continuous spectrum.

(3) Bright lines brightest when continuous spectrum brightest.

(4) Bright lines broad and diffuse, particularly when star at maximum. D lines very hazy, so that components are hardly distinguishable.

(5) No really remarkable changes in the appearance of the spectrum took place during greater part of period. Observations show no relation between spectral changes and secondary minimum of the star.

(6) Most remarkable changes at principal minimum. "The bright lines became dimmer and perhaps sharper. The fainter bright lines disappear. The D lines become darker. Strong absorption lines appear on the more refrangible side of certain bright lines in the green, the separation of the dark and bright lines being at least five-tenth-metres. Other bright lines are perhaps similarly affected. A narrow dark line appears above the D_3 line at the same time. Shortly before the first maximum is reached the dark lines disappear."

Prof. Keeler adds that the method of observation he adopted was only capable of allowing him to observe a "part of a much more complex series of changes" which no doubt takes place.

Société Astronomique de France.—In the *Bulletin* of this society for 1892, the sixth year since its foundation, several articles of importance will be found to be scattered throughout its numerous pages. Of these we may refer our readers to some selenographic studies by MM. Gaudiberi, Flammarion, and Antoniadi, examination of recent studies of Jupiter by M. Flammarion, and M. Edouard Foulséré's graphical method of determining the co-ordinates of solar spots. The valuable observations made by M. E.-L. Trouvelot on the planets Venus and Mercury, a full account of which has been given in these columns (Nature, vol. xlvi. p. 468), will also be found here, together with a discourse by M. F. Tisserand on the movement of the moon, with reference to ancient eclipses. Among other communications M. Schmoll gives a summary, with tables, of the solar spots observed during the year 1891, M. Guillaume describes his observations on the surface and rings of Saturn, and MM. Quenisset and Trouvelot contribute their observations on planets and remarkable solar protuberances respectively. A simple method of determining the positions of solar spots, and of measuring their displacements, is treated by Dr. Huette, while M. Bruguière gives a most interesting account of M. Lippmann's work on photography in colours, and M. Pluvinel on the coming (now past) eclipse of the sun.

Wolsingham Circular, No. 34.—With reference to the contents of the Wolsingham Circular, which we recently gave, Dr. Kreutz, in *Astronomische Nachrichten*, says:—"The first star, Esp.-Birm 180, is certainly given by Chandler as (2258). Aurigæ in his list of probable variable stars A. J. 216; see also *Astronomische Nachrichten*, 2764, p. 63, No. 2. The second star is evidently identical with B.D. + 57°·727 = A. G. Hels. 3032. Position for 1900: 3h. 23m. 23s., + 58° 9′·0. The original magnitudes of the Hels. zones are: 9·1m (February 15, 1872), and 9·0m. (February 15, 1873).

Astronomical Journal Prizes.—The judges appointed by the editor of the *Astronomical Journal* say a few words in the current number (No. 293) with reference to some general considerations connected with the presenting or withholding of the awards. For comet observations, allowance for optical qualities of telescopes will to a certain extent be made; relative freedom from systematic peculiarities of observation will be regarded "as a mark of excellence. Even more important than the nominal or apparent precision in other respects." For individual precision of observations, freedom from large or abnormal errors